

gives the name of *Cardiocarpum Butterworthii*, after its discoverer. These seeds exhibit no specialized organ corresponding to the lagenostome of *Lagenostoma* and other seeds described. The pollen has passed down the long narrow micropyle into the triangular space at its inner extremity, where it came into direct contact with the endospermic membrane. It thus appears that the seeds known by the name of *Cardiocarpum* have a very simple organization, approximating somewhat closely to that of the ovules of *Juniperus*, *Callitris*, and *Welwitschia*.

Some small seeds, which appear to be identical with the *Cardiocarpum tenellum* of Dawson, found in great numbers on slabs of shale by Mr. John Smith, of Kilwinning, in Ayrshire, are described. They were found in the upper Coal-measures near Stonehouse in Lanarkshire.

The last form noticed is a very curious winged seed from the uppermost Coal-measures of Ardwick, at Manchester, and which appears to have been a double seed, resembling in general form the samara of an ash. It belongs to Brongniart's genus *Polypterospermum*.

The fact that large numbers of seeds of unmistakable flowering plants exhibit very close resemblance to the ovules of Gymnospermous seeds is a very important one. Prof. Newberry has obtained such seeds in America; M. Grand-Eury has done the same thing in France; and it now appears that, though attention has but very recently been drawn to the existence of the smaller forms now described in the British Coal-measures, the discovery of a considerable variety has already rewarded the researches of the author and his auxiliary friends. There is no doubt that further research will materially increase that number. The question naturally arises, where are the Gymnospermous plants to which these seeds belonged? Finding the latter in the thin "upper-foot" coal-seam suggests that other remains of their parent stems should also be found there. The *Dadoxylons* are the only ones which exhibit any probability of such relationship. But these have chiefly been found in the marine Ganister bed, which underlies the upper-foot coal from which the majority of the seeds have been derived, indicating that the *Dadoxylons* grew apart from the Calamites and Lycopods abounding in the coal side by side with the seeds. Time alone can solve these problems, as well as others relating to the true homologies of some of the structures contained within these seeds.

MISCELLANEOUS.

On the Discovery of the Trigonia aenticostata (M'Coy) in the Living State. By F. M'Coy, Professor of Natural Science in Melbourne University.

To the Editors of the Annals and Magazine of Natural History.

GENTLEMEN,—The Admiralty Marine Surveyor for the Colony of Victoria, Captain Stanley, has just sent me for the Public Museum

a small parcel of shells dredged by him and Mr. Crispo, of his ship, in Bass's Straits. Amongst them I was greatly interested to find a fresh living specimen of the *Trigonia acuticostata*, which I described some years ago as one of the most abundant of our Miocene Tertiary species in some localities. The discovery that it still lives, although an excessive rarity in our seas (only the one example being known), will be welcomed by conchologists as well as geologists, from the very small number of living species of *Trigonia* known. This specimen shows, in even greater clearness than the fossil ones, the total distinction of the ribs from those of the hitherto known living species. The naere of the interior is pearly white.

I have, &c.,

FREDERICK M'COY.

On the Reproduction of the Dioecious Volvox.

By M. L.-F. HENNEGUY.

Only two species of *Volvox* are known, *Volvox globator*, L. (*V. stellatus*, Ehr.), and *Volvox minor*, Stein: the former is monœcious (*Volvox monoicus*, Cohn); that is to say, the male and female elements are united in the same individual; the second is dioecious (*Volvox dioicus*, Cohn).

Cohn has just published (Beiträge zur Biologie der Pflanzen, 1875) a new monograph of the *Volvox monoicus*, in which he describes the reproduction of this species. I have been enabled, on my part, to trace the mode of evolution of the *Volvox dioicus*, and to observe some facts which have not yet been noticed.

Each *Volvox* is a colony (*cœnobium*) formed of small unicellular algæ, furnished with vibratile cilia, and regularly disposed in the thickness of the gelatinous wall of a hollow sphere. There are four kinds of cœnobia:—1. Some consist only of vegetative cells enclosing in their interior young cœnobia, or daughter-colonies, each one originating by the division and multiplication of a vegetative cell; 2. A large number of these cœnobia contain at the same time male elements, or androgonidia, situated in the thickness of the gelatinous wall; 3. Others only present with the vegetative cells some androgonidia, and do not produce daughter-colonies; 4. The female cœnobia contain only gynogonidia, or oospheres, placed in the interior of the sphere.

The androgonidia are formed at the expense of a vegetative cell, which acquires a slightly larger volume than the others and divides into parallel segments. Each of these segments is in the form of an elongated cone: its thickest extremity is green; the other, transparent, presents a small red spot and two vibratile cilia. The bundle of antherozoids displays in the antheridium a constant oscillating movement.

The gynogonidia are, in like manner, produced by the differentiation of a vegetative cell. This becomes much more voluminous than the androgonidia, and filled with a large quantity of starch and chlorophyl granules, which give to the oosphere thus formed a deep-green appearance.